

REPLACEMENT SHEET
Application No.: 09/451,090
Art Unit: 2151

Title: System and Apparatus for Storage and Transfer of Secure Data on Web
Inventor: Ravi Sandhu

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	Domain	Flag	Path	Cookie_Name	Cookie_Value	Secure	Expiration
Cookie 1	acme.com	TRUE	/	Name	Alice	FALSE	12/31/99
•			•		•		
•			•		•		
•			•		•		
Cookie n	acme.com	TRUE	/	Role	manager	FALSE	12/31/99

An Example of Cookies on the Web

FIG. 1

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	Domain	Flag	Path	Cookie_Name	Cookie_Value	Secure	Expiration
IP_Cookie	acme.com	TRUE	/	IP_Cookie	129.174.100.88	FALSE	12/31/99
Pswd_Cookie	acme.com	TRUE	/	Pswd_Cookie	hashed_password	FALSE	12/31/99
KT_Cookie	acme.com	TRUE	/	Kerberos_Ticket	{Alice, Kc,s}Ks	FALSE	12/31/99
Sign_Cookie	acme.com	TRUE	/	Sign_Cookie	Signature_of_Alice	FALSE	12/31/99

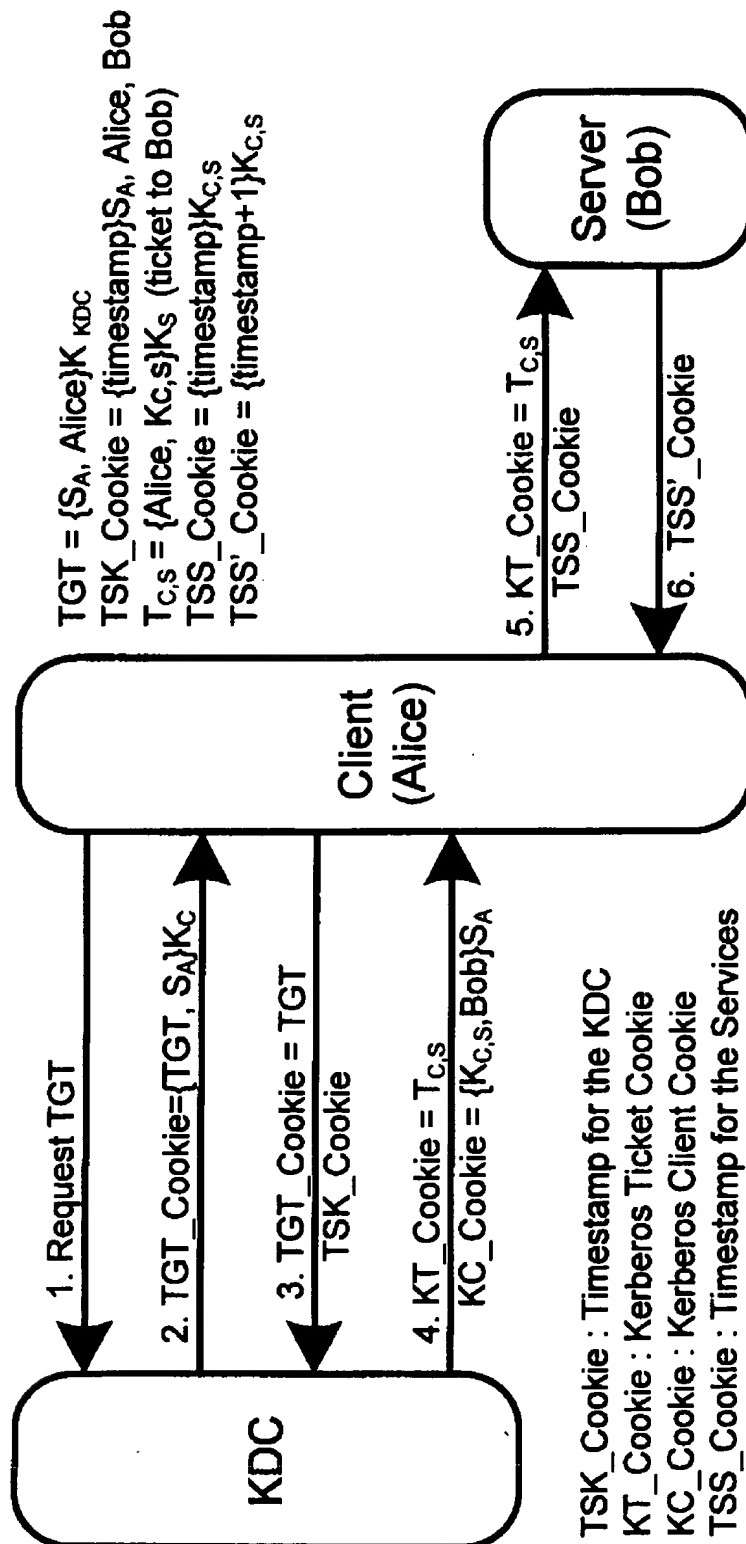
Authentication Cookies

FIG. 2

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	Domain	Flag	Path	Cookie_Name	Cookie_Value	Secure	Expiration
Cookie 1	acme.com	TRUE	/	Name	Alice*	FALSE	12/31/99
•			•		•		
•			•		•		
•			•		•		
Cookie n	acme.com	TRUE	/	Role	manager*	FALSE	12/31/99
Pswd_Cookie	acme.com	TRUE	/	Pswd_Cookie	mashed_password	FALSE	12/31/99
Key_Cookie	acme.com	TRUE	/	Key_Cookie	mncrypted_key*	FALSE	12/31/99
Seal_Cookie	acme.com	TRUE	/	Seal_Cookie	Seal_of_Cookies**	FALSE	12/31/99

Sealing Cookies

* Sensitive fields can be encrypted in the cookies.

** Seal of Cookies can be either MAC or signed message digest of cookies.

Pswd_Cookie can be replaced with one of other authentication cookies in Figure 2

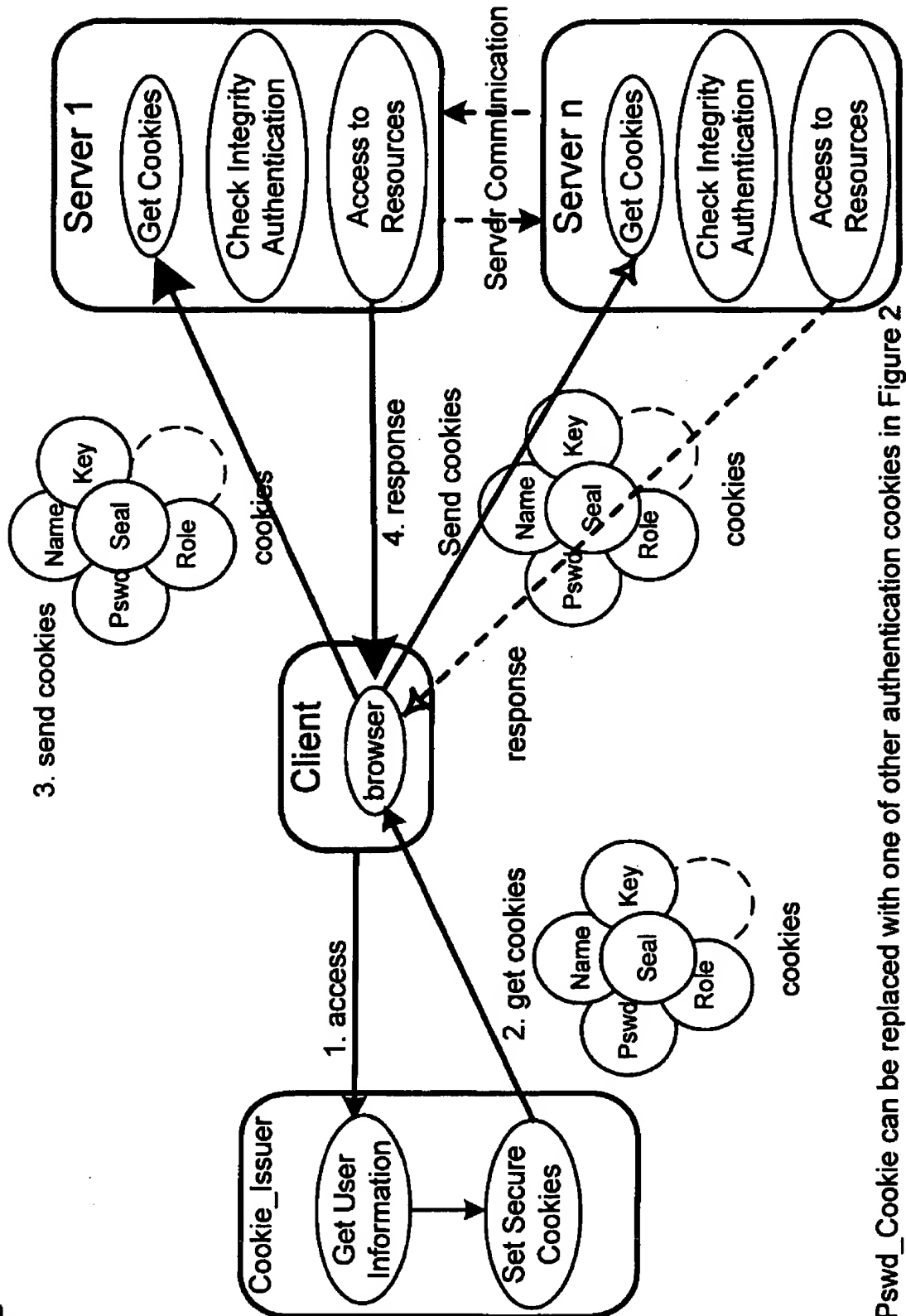
A Set of Secure Cookies on the Web

FIG. 4

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Pswd_Cookie can be replaced with one of other authentication cookies in Figure 2

How to use Secure Cookies on the Web

FIG. 5

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Domain	Flag	Path	Cookie_Name	Cookie_Value	Secure	Expiration
acme.com	TRUE	/	Name	Alice*	FALSE	12/31/99
acme.com	TRUE	/	Card	number::123456789*& exp_date::Jan.2000*	FALSE	12/31/99
acme.com	TRUE	/	Coupon	ID::123&off::10%*	FALSE	12/25/98
acme.com	TRUE	/	Pswd_Cookie	hashed_password	FALSE	12/31/99
acme.com	TRUE	/	Key_Cookie	encrypted_key*	FALSE	12/31/99
acme.com	TRUE	/	Seal_Cookie	Seal_of_Cookies**	FALSE	12/31/99

* Sensitive fields can be encrypted in the cookies.

** Seal of Cookies can be either MAC or signed message digest of cookies.

Pswd_Cookie can be replaced with one of other authentication cookies in Figure 2

An Example of Secure Cookies for Electronic Transactions

FIG. 6

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	Domain	Flag	Path	Cookie_Name	Cookie_Value	Secure	Expiration
Cookie 1	acme.com	TRUE	/	Name	Alice*	FALSE	12/31/99
			•		•		
			•		•		
			•		•		
Ticket_Cookie	acme.com	TRUE	/	Ticket	ID::456&Hours::10*	FALSE	12/25/98
Pswd_Cookie	acme.com	TRUE	/	Pswd_Cookie	hashed_password	FALSE	12/31/99
Key_Cookie	acme.com	TRUE	/	Key_Cookie	encrypted_key*	FALSE	12/31/99
Seal_Cookie	acme.com	TRUE	/	Seal_Cookie	Seal_of_Cookies**	FALSE	12/31/99

Sealing Cookies

* Sensitive fields can be encrypted in the cookies.

** Seal of Cookies can be either MAC or signed message digest of cookies.

Pswd_Cookie can be replaced with one of other authentication cookies in Figure 2

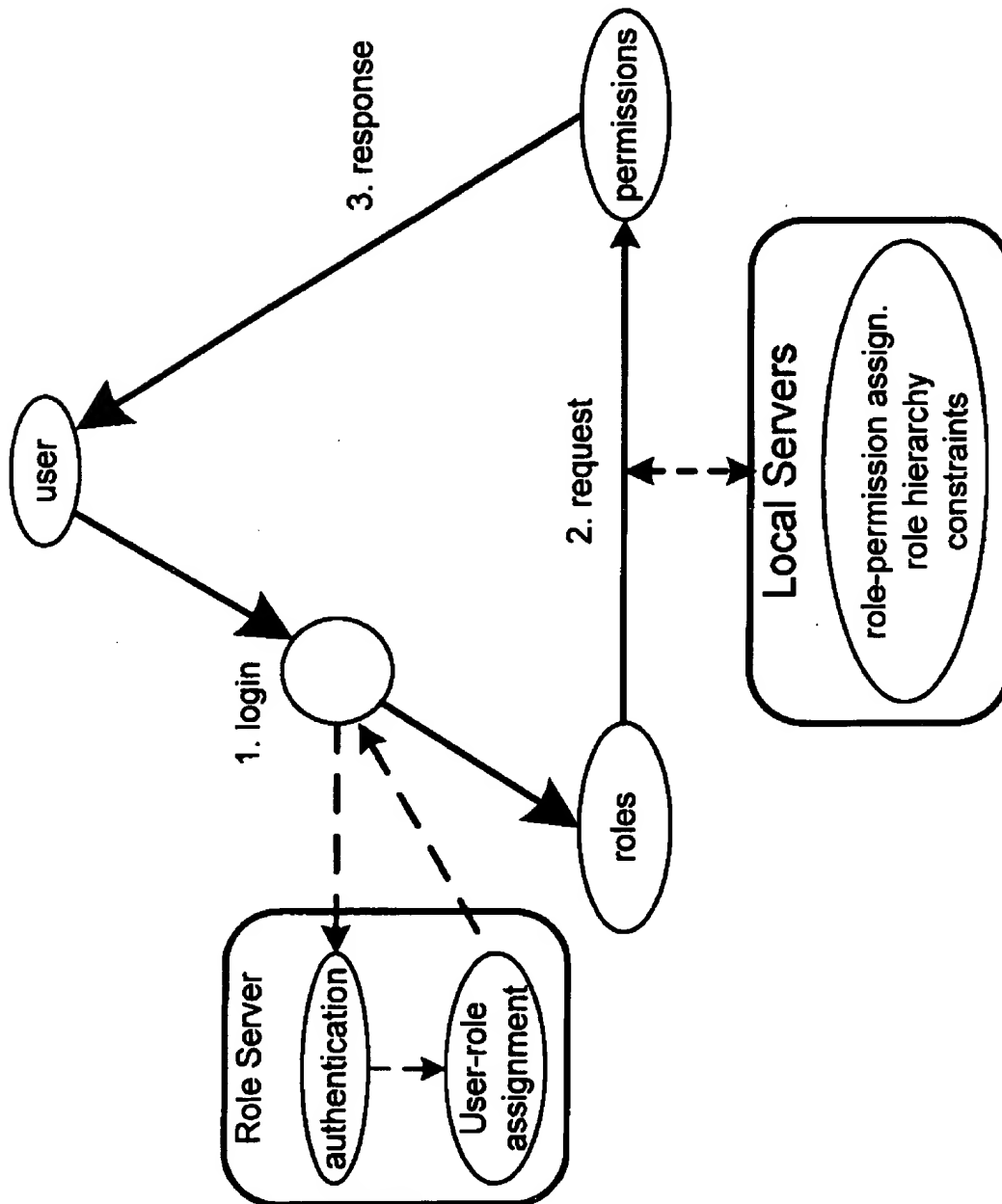
An Example of Secure Cookies for Pay-per-Access

FIG. 7

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A Schematic of RBAC on the Web

FIG. 8